ED 374 139 TM 022 014

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TITLE Modification of the LASSI for Adult Learners in Distance Education Programs: A Preliminary Report.
SPONS AGENCY National Univ. Continuing Education Association, Washington, DC.
PUB DATE May 93
NOTE 19p.; Paper presented at the Adult Learner Conference (May 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Adult Education; *Adults; Anxiety; *Distance Education; Factor Structure; *Norms; Special Needs Students; *Test Construction; Test Use
IDENTIFIERS *Learning and Study Strategies Inventory

ABSTRACT

Distance education programs for adult learners have been largely neglected by developers of diagnostic instruments to identify students' level of academic preparedness. The purpose of this study was to modify the Learning and Study Strategies Inventory (LASSI) so that it could be used for learners in distance programs (A-LASSI) and to generate normative information for the adult version of the instrument. Another purpose was to examine the factor structure of the new instrument to determine if the original 10 subscales were preserved. In a sample of nearly 800 adult learners enrolled in a national external degree program, the A-LASSI (modified for adults) generated 7 factors instead of the 10 measured by the original LASSI, revealing that only the Anxiety scale remained intact from the original LASSI instrument. These seven factors did not entirely replicate subscales of the original instrument. Results indicate that adult learners, particularly those who pursue distance or external degree programs, have somewhat different learning needs than students of traditional age in campus-based programs. Norms for the LASSI instrument may need to be adjusted upward for adult distance learners. (Contains 19 references.) (Author/SLD)

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Modification of the LASSI for Adult Learners in Distance Education Programs: A Preliminary Report

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Paper presented at the Adult Learner Conference, May, 1993.

This research was partially funded by a research grant from National University for Continuing Education Association (NUCEA).

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Abstract

Distance education programs which attract adult learners have been largely neglected by developers of diagnostic instruments to assist students in the identification of level of preparedness for academic study. The purpose of this study was to modify the LASSI so that it could be used for adult learners in distance programs (A-LASSI), and to generate normative information for the adult version of the instrument. Another purpose of this study was to examine the factor structure of the new instrument to determine if the original 10 subscales were preserved. In a sample of nearly 800 adult learners enrolled in a national external degree program, the A-LASSI (modified for adults) generated 7 factors instead of the 10 factors measured by the original LASSI; revealing that only the ANXIETY scale remained intact from the original LASSI instrument. These seven factors did not entirely replicate the subscales of the original LASSI instrument. The results from this study indicate that adult learners, particularly those who pursue distance or external degree programs, have somewhat different learning needs than traditional age students in campus-based programs and the norms for the LASSI instrument may need to be adjusted upward for adult distance learners.

Introduction

In the early 1980s, in response to the needs arising from underprepared college students entering higher education, Weinstein and her colleagues began work toward the development of a diagnostic instrument that would assess an individual's learning strategies (Weinstein, Schulte, and Cascallar, 1983). According to Weinstein (Weinstein, Zimmerman & Palmer, 1988), available instruments did not measure learning skills associated with a variety of cognitive strategies for effective learning. For example, many instruments assessed math ability, reading comprehension, note taking skills, and time-management skills which focus either on academic content or on the regularity of studying. Weinstein claimed that techniques related to "active learning" were not being assessed by any of the available tools; but most importantly, she also criticized the psychometric properties of available instruments. She stated that many of these available instruments lacked validity and that none were validated specifically as diagnostic instruments. The LASSI (Learning and Study Strategies Inventory, 1987) was developed to address the need for a diagnostic instrument that could be used by academic advisors. College staff or advisors could identify student strengths and weaknesses and could provide at risk students with feedback or information about strategies that would optimize their success in a variety of learning situations common to higher education settings. However, the population Weinstein and her colleagues had in mind was traditional college age students attending campus-based degree programs.

Although the LASSI was developed and normed on traditional age college students

who attended campus-based programs, the types of skills measured by this questionnaire, such as time-management, test-taking, self-testing strategies, motivation, etc. could have potential benefit in determining student success in distance education programs. Distance programs could employ the LASSI as either a diagnostic tool in determining remediation interventions or as a way of determining how well individual student profiles match profiles of successful adult distance learners. The purpose of this research project was to modify the LASSI (Learning and Study Strategies Inventory, 1987) and obtain normative information on adults in distance education programs.

In the last decade higher education has witnessed an increase in the enrollment of the nontraditional or older student (NCES, 1992)-- a phenomena commonly referred to as the "graying" of American campuses. At the same time, access to higher education for adult learners has dramatically increased due to a proliferation of programs,available nationwide, designed to attract and accommodate the life style of working, returning adult students. In addition, the combination of an expotential surge and a growing acceptance of distance education and/or delivery options (Moore, 1990; Hall, 1991) has opened the doors to higher education as never before; eliminating many barriers for working adults. Students can enroll in a variety of courses that are provided solely via the computer or a series of video tapes. Recently Powell et al. (1990) depicted the rapidly changing role of distance education noting that it is gradually moving "from a marginal to an integral role in the provision of post-secondary education (p. 5)." As adults return to higher education, especially if they opt for one of the many off-campus

programs, an assessment of learning skills and strategies could assist these individuals in determining their level of preparation to engage in the required tasks that lead to academic success. Pursuing an external degree or a distance program requires skills that transcend pure academic content and requires high levels of organization, goal commitment and certain situational/family circumstances.

Many adults return to school after being away for many years from any type of formal educational setting and their previous educational experiences may not have required the self-direction and motivation skills that is essential for distance study. Most of the research on adults in distance or external programs clearly indicate that a successful student is one who is highly motivated, who experiences initial success and possesses good time-management skills (Moore, 1990; Candy, 1991). Wlodkowski (1986) states that motivation is important for several reasons: as a necessary factor for learning to occur; and as a consequence of learning. Rainst (1981) believes that motivational factors may be the sine qua non of persistence in educational endeavors. Without intrinsic motivation, effective learning strategies in comgination with good scheduling or juggling of priorities, adult students become frustrated and quickly lose confidence in their academic abilities which in turn affects their productivity and leads to failure (Powell, et al., 1990; Sweet, 1986). Negative academic incidents are attributed to lack of academic ability which contributes to stopouts or dropouts and slows the adult's progress toward attaining their higher education goal (Peters, 1992; Bernard & Amundsen, 1989).

Furthermore, recent increases in the participation rates of underprepared students in higher education has also impacted student success rates and student outcomes; this impact has an even more dramatic effect in distance education programs which have open admission policies and few access barriers to higher education. As more underprepared individuals enter higher education, traditional colleges implement a variety of student-centered programs that assist students in acquiring important skills, such as information processing skills, studying skills, test-taking strategies, note-taking skills and time management strategies. In addition, most campus-based institutions provide specific remedial interventions for any deficiencies in math and writing skills (NCES, 1990). Distance education programs or external degree programs for adults are less able to provide underprepared students with the necessary skills for success in higher education since the design of such programs are not conducive to traditional remediation interventions. Distance programs rely heavily on student motivation and self-directedness which may be deficit in an underprepared population accostumed to negative academic experiences. Much of the infra-structure available at traditional colleges does not exist in non-traditional/independent study programs. Therefore, student success in nontraditional or alternative types of programs may be predicted by an initial assessment of student characteristics typically associated with distance programs; the skills and characteristics relevant for self-directed, self-paced, independent study. The authors believe that these skills are currently being measured by the LASSI. In fact, Keane (1993) found that the information processing strategy scale as measured by LASSI was a predictor of success for ESL students in a campus based nursing program and

made specific recommenda-tions for the use of LASSI scales for ESL college students. In part, this project was conceived because of the lack of tools available to assist non-traditional programs enrolling primarily adult learners with a means of assessing attributes and skills for adults.

Gibson and Graff (1992) recommend that adults should be informed about the need to learn about different types of studying and learning strategies. They argued that by acquiring information about studying and learning techniques, adults could select the route best suited to fit their unique life styles and learning styles. They further claim that adults could then apply this new knowledge about their learning strategies as a way to "provide structure and direction to their studies". Smith (1983) supports such a recommendation and points out that the knowledge of tendencies in learning and information processing can be helpful to students in determining where, when and how to learn and in solving problems associated with particular content areas. If an adult version of the LASSI (A-LASSI) could be developed, adults pursuing distance or external degrees could use it to self-assess their studying and learning strategies. These nontraditional students could use A-LASSI scale scores as a way of identifying any areas of weaknesses that may suggest remediation BEFORE they seriously begin pursuing an independent study, or as a way of determining specific methods (e.g. structured courses vs. examinations, etc.) for successful degree completion. Such a self-assessment process may reduce the high rate of drop outs that are associated with distance programs. Furthermore, the A-LASSI could be used by college administrators and advisors.

College personnel could utilize A-LASSI results in determining the likelihood of student success and it could assist advisors in developing degree program plans that would take advantage of individual student's strengths and address areas of weakness.

The LASSI is a self-administered questionnaire which consists of 77 items with 10 subscales that assess an individual's approach to learning situations, including attitudinal and motivational aspects of the learning and studying process (Weinstein et al, 1988). Figure 1 lists the 10 scales and provides a brief description of each scale. The authors believe that these scales transcend educational settings and with slight modification can

Figure 1 Scales Measured by the LASSI

SCALE	Description
ATT	Attitude about and interest in college
MOT	Level of motivation or willingness to work hard for college, diligence stays "on top of" things and self discipline.
TMT	Use of time management principle for academic tasks. Uses time well, good organization, systematic planning of time use.
ANX	Anxiety or frequent worry about school may worry so much that it is hard to concentrate; easily discouraged about grades; nervous even when well prepared.
CON	Ability to concentrate, pay close attention, listen carefully and think about what is being said.
INP	Use of imagery and verbal elaboration; thinks about how new information fits with what is already known; translates information into one's own words; uses logic
SMI	Be able to pick out key ideas and critical points in information read or heard
STA	Making use of a broad approach to learning, use of aids to help learning; supplements learning with helpful techniques; makes use of key words, practice exercises, sample problems, examples, headings, diagrams, etc to help learning
SFT	Self-testing information learned, reviewing regularly, and preparing for classes
TST	Measures the approach toward taking tests and exams; reviews the right information

easily be adapted for a distance education program. Many of the scales measured by the LASSI are important to success not only in traditional, campus-based programs but probably weigh more heavily in predicting success in an independent study program. It is our contention that the LASSI can play an important role in the identification of student learning strategies that are related to success in distance education.

The purpose of this research project was: 1) to modify and adapt the current items

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on the LASSI to suit adult learner needs and add items relevant to an adult student population and 2) determine if the modified version of the A-LASSI completed by a representative national distance education population of adult learners changed any of the psychometric properties of the original tool. For example, does the adult version of the LASSI (A-LASSI) generate similar norms as the traditional student group? Koymen (1992) modified the LASSI and administered it to traditional university students and open university students (distance learners) in Turkey and found that distance learners scored higher on the time-management and self-testing LASSI scales. Koymen, however, only reported mean scale scores and did not provide normative information about the modified LASSI instrument.

This study also examined how well the A-LASSI replicated the 10 scales of the original tool. That is, were the original dimensions, such as motivation, test-taking skills, time-management skills, etc. preserved in the adult-LASSI? A study by Chacko and Huba (1991) administered the LASSI instrument to 134 nursing students who attended a midwestern community college; over two thirds of this sample were adult learners. Chacko and Huba were unable to replicate the original LASSI scales; their factor analyses yielded only 4 factors. However, this finding may be attributed to the small sample size in the Chacko and Huba study. In addition, Chacko and Huba included factor loadings falling below the typical .50 cut off and based their interpretations of these factors on **all** items that loaded.

Method

Instrument

Approximately one third of the original 77 items on the LASSI (1987) were modified for an adult population participating in a variety of learning situations (distance and traditional courses). Most of the modifications of the A-LASSI were minor; for example, one item from the concentration scale of the original LASSI was:

> "Problems outside of school - being in love, financial difficulties, conflict with parents, etc. - cause me to neglect my school work."

this item was changed on the A-LASSI to :

> "Problems outside of college - being in love, financial difficulties, conflict at work or home, etc. - cause me to neglect my studies."

In addition, 6 new items were developed and added to the A-LASSI (adult version). Therefore, the A-LASSI contained a total of 83 items (77 items from the original instrument and 6 new items). All items were scored along the originally developed 5 point Likert scale anchored by 1 -Not at all typical of me to 5 - very much typical of me.

Participants

Students enrolled in a national external degree program were asked to volunteer to participate in a pilot norming study. A total of 2,000 A-LASSIs were mailed to adult learners pursuing associate and baccalaureate degrees through Regents College of The University of the State of New York (USNY), a national non-instructional, assessment-based, external degree program. While some students complete their degrees entirely by examination, the typical Regents College student earns their college degree through a combination of : college courses, recognized college level proficiency examinations and, distance or correspondence courses. The average Regents College student is 39 years old and works full time. The sample of participants were randomly drawn from lists of

enrolled students in the four degree programs offered at Regents College : nursing, business, technology and liberal arts. Students residing outside of the United States were eliminated from the lists. Just over 800 A-LASSIs were returned and after deleting unusable questionnaires, a total of 790 A-LASSIs were computer scanned yielding a 40% return rate.

Results

All A-LASSIs were edited for preparation for computer scanning and SPSS PC+ 5.0 was used for all statistical analyses. Mean inter-item correlation coefficients were computed for each of the ten scales of the LASSI which are displayed in the table below.

Scale	Mean inter-item correlation
Anxiety	.42
Motivation	.34
Time-Management	.43
Attitude	.25
Concentration	.36
Information Processing	.38
Selecting Main Ideas	.33
Study Aides	.22
Self-Testing	.36
Test Taking	.35

Low coefficients were found for the Attitude, Selecting Main Ideas and Study Aides scales indicating that the items comprising these scales poorly fit together. This data suggests that these scales will probably not stay intact when factor analyzed. Estimates of reliability were obtained by computing Cronbach's alpha for all 10 scales and percentiles were computed in order to generate the norms for adult learners. Figures 2, 3, and 4 present the reliability coefficients and the normative information for the original

LASSI scales as well as A-LASSI. Not surprising, low reliability coefficients were obtained on attitude, selecting main ideas and study aides scales which are the same scales that produced low inter-item coefficients. All other reliability coefficients were high and well within acceptable standards. The percentile data clearly shows that an adult non-traditional off-campus student population is somewhat different from traditional campus-based students. On all scales except for the study aides, adults scored higher. The scores at the 50 and 75 percentiles reveals that the adults consistently scored higher on most of the LASSI scales than the original norming group of traditional students in campus based programs.

Factor analyses were performed on the A-LASSI to determine if the original 10 scales would be replicated. The data were submitted to a principle components analysis employing a varimax rotation. Factor analyses were run to extract 10, 9, 8, 7 and 6 factors. Using the Kaiser criterion to retain factors with eigenvalues greater than 1, it was determined that the 7 factor solution was the best fit and most interpretable. Figures 5, 6 and 7 depict the resulting factor structure and all factors were orthogonal - that is, not a single item loaded simultaneously on more than one factor. Factor loadings below .50 were dropped from the factor structure. Results from the factor analyses indicates that probably only 7 dimensions are being measured by the A-LASSI. Since modifications to the original LASSI instrument were minor this suggests that nontraditional students are somewhat different than traditional students in learning and study strategies.

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As can be seen in the Figure 2, Factor 2 - Anxiety was the only scale from the LASSI that remained intact following the factor analyses; most factors consisted of some mixture of items from two or three different LASSI subscales. Reading through the items that loaded on Factor 1, this factor measured time-management or self-discipline strategies that one could use to pace oneself to complete college studies. All but one item from the original time-management scale loaded on this factor; in addition, three items from the concentration scale, one item from the motivation scale and two items that were developed by the authors all loaded on Factor 1.

Items that loaded on Factor 3 consisted of the entire original information processing subscale from the original LASSI and two study aides items. These two items seem to reflect strategies commonly used by adults to assist them to process the information necessary to understand content for either their course work or examinations. Nine items loaded on the fourth factor, however these items were drawn from four different LASSI subscales. Items clustering on this factor are techniques students engage in to prepare for class work, examinations or assignments. In part this preparation appears to overlap with an individual's intrinsic motivation to complete their college studies.

Factor 5 consisted of 13 items drawn from three different LASSI subscales: test-taking, concentration and selecting main ideas. All but one item from the LASSI test-taking scale loaded on this factor. Items that loaded on this factor appear to denote comprehension skills or attention to college work. Six of the original LASSI items from

the attitude scale loaded on Factor 6 and one item that was developed by the authors. Items that loaded on this factor clearly denote the affective component associated with college study. The last factor only generated two items. Factor 7, labeled social/peer support strategies, is not always an available studying strategy for adults who pursue external degrees or distance education programs. This factor may have more relevance to distance programs which foster interaction between students. For instance, programs that require limited residency requirements would provide students an opportunity to engage in some social comparison information as well as academic comparison information. Students enrolled at Regents College, currently do not have any structured activities designed by the college that would allow these students to exchange information.

Discussion

Currently, most distance programs do not consistently provide any diagnostic tools that could be used by advisors to assist students in determining whether or not they have the requisite skills for independent college study and to provide a basis for advisement for students with deficit skills. This research project modified and created an adult version of the LASSI and generated normative information for adult learners in distance education programs. Adult norms on the modified A-LASSI version when employing the 10 subscales as configured by the original LASSI instrument are clearly higher than those obtained for traditional students. However, the factor analyses questions the use of the 10 subscale configuration developed by Weinstein et al. for adult learners. It appears

that the A-LASSI can be parred down to 64 item instrument measuring only 7 scales. The scales measured by the A-LASSI are:

self-discipline routines/time management
anxiety
studying techniques
preparation techniques
comprehension skills
attitude toward college
social/peer support

Future research should be conducted to determine the stability of the A-LASSI as a 64 item questionnaire. We believe that the A-LASSI can be used to assist adults in determining their level of preparedness for college study. Clearly more research should be conducted to validate the A-LASSI with academic performance. The authors are also conducting another study to determine if indeed the A-LASSI is associated with academic progress, persistence and academic performance.

One limitation of this research study was that the population used to norm the A-LASSI consisted of adults in an external degree program that does not provide structured contact between students or faculty. Perhaps obtaining results from an adult learner population that has faculty and student contact would generate different norms. Another limitation was that the participants in this study was a self-selected sample. It may be that only those students who are highly motivated to learn and who perceive themselves to be proficient learners elected to participate in this study. Further research should be conducted to answer some of these questions.

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